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RADIO-THERAPY.

Diseases of the Skin, including Radiotherapy and Radiumtherapy. By Prof. E. Gaucher. Translated and edited by Dr. C. F. Marshall. Pp. xii+460. (London: J. Murray, 1910.) Price 15s. net.

A FULL account of the use of X-rays and radium in the treatment of various diseases of the skin is given in this volume. The most recent developments in radium treatment are described by Wickham, Degrais, and Dominici. X-ray treatment is described by Gastou and Zimmern. The illustrations are mostly from wax models in the St. Louis Hospital Museum and from Prof. Gaucher's private collection.

The treatment of vascular nævi by radium is fully described and illustrated. The radium salt mixed with finely powdered sulphate of barium is spread with varnish in a thin layer on a metal plate. The treatment consists in the application of this apparatus to the nævus, the dosage being regulated according to the form and depth of the nævus. In flat nævi large doses may be given by direct application for short periods, the dose being timed to cause a certain degree of curative inflammatory reaction. Another method is to give smaller doses filtered through screens which absorb the less penetrating rays, longer exposures being given in this case. There is no reference in the book to the new method of treatment by the application of sticks of solid carbon dioxide.

In cavernous nævi containing large blood-vessels the doses used must not be sufficient to produce inflammation of the surface. The results are very satisfactory, the nævi being decolorised and levelled, and the final results on the whole better than those obtained by any other known means.

In the treatment of cheloid, or scar tissue tumours, very favourable results are obtained both by X-ray and by radium treatment. Radium is less liable to cause dermatitis, and may therefore eventually supplant the X-rays in the treatment of cheloid.

Coming now to the important subject of the treatment of cancer, the very malignant form of growth known as sarcoma, though occasionally greatly reduced in size by X-ray treatment, is seldom cured, and this treatment should on no account be relied upon where there is any chance of success from operative removal of the growth. Treatment by radium may also be tried, but its value remains to be proved; apparent improvement is frequently obtained by its use.

Coming to the skin cancers, or epitheliomata, electricity may be applied in various ways—the electric spark, X-ray treatment, and fulguration. The electric spark treatment is applied by connecting a naked electrode with a high-frequency resonator. The method has been successfully employed in small epitheliomas of the skin. Its action is mainly destructive, while it has the advantage of promoting repair by cicatrisation. The procedure consists in riddling the diseased tissue with small, very short sparks.

Fulguration is a method of using the sparks from a high-frequency resonator by means of Keating-Hart's special electrode for the treatment of growths which are widely and deeply ulcerated, and too great in extent to be destroyed by the cautery. The operation is painful, and must be performed under local or general anæsthesia. The special electrode consists of a hollow metallic rod sliding in an ebonite sheath, and a bellows for blowing a current of carbonic acid gas or air through the rod to prevent the excessive production of heat. The ulcerated surface is subjected to the action of sparks which are usually 7 or 8 centimetres in length. This causes the blood-vessels of the healthy surrounding parts to contract, while the tumour itself is softened within a few minutes. Surgical treatment is then applied, the softened masses of growth being cut or scraped away. The sparking is then repeated carefully and energetically until all growth has been destroyed. A single application is usually sufficient, but any focus of recurrence must be treated again. The results of this treatment are not so good as appeared from the first accounts of patients treated in this way, and the use of the method does not appear to be extending.

The X-ray treatment of cancer is fully treated, the various forms of apparatus for the production of the high-tension current necessary to excite a Crookes's tube being described. The methods of regulating and measuring the dose are also given in full. The author finishes by stating that

"the most ardent partisans of radiotherapy recognise that the X-rays are not always successful in the treatment of epithelioma. Some epitheliomas are rapidly modified by radiotherapy, while others remain unaffected. In the results published, it is necessary to take into account the age of the tumour, its surface, extent, and depth, its situation as regards accessibility to the action of the rays, and also the technique employed, which varies with different operators. In short, radiotherapy may be used in certain cases on the chance of a successful result, provided it is not employed too late; but we must not have too much confidence in this method."

Radium treatment of cancer is fully described by Dominici.

The properties of the alpha-, beta-, and gamma-rays are described, and also the method of eliminating the less penetrative rays by filtration through sheets of lead of various thicknesses. The salts of radium are used mixed in small or large proportions with a salt of barium (sulphate or bromide). This is mixed with varnish and spread on metal or linen. In some cases discs or square sheets of metal are covered with the varnish containing radium; in others rods are used, the ends of which are bulbous, oval, cylindrical, or spatulate. Applications can thus be made to surfaces of various form or to the interior of passages. Another form of apparatus consists of discs or squares of lint covered on one side with the radium varnish and enclosed at the borders in a metal frame; these can be adapted to the shape of the affected region.

The radio-activity of radium is usually compared with that of uranium. If uranium be taken as the unit the activity of pure radium is two million. In the case of a mixture of radium and barium salts, the

activity of the mixture is inversely proportional to the quantity of the barium salt. In the treatment of cancerous tumours, apparatus of 500,000 activity are used. Such an apparatus usually contains from 4 to 10 milligrams of powder, consisting of one part of radium salt to three of barium salt. Cancers suitable for radium treatment range from those of small size to those of 20 to 30 square centimetres in area. The apparatus may be used in two different ways, either by the so-called dry method, consisting of short, frequently repeated applications causing resolution of the diseased tissue without external destruction, or the destructive method in which the apparatus is left in place from seven to ten hours, causing extensive destruction of the morbid tissue followed by cicatrization in eight to ten weeks.

For cancers which extend, deeply filtration of the rays is employed by the interposition of a half to several millimetres thickness of lead. In this way only the ultra-penetrating rays (the gamma-rays and the hardest beta-rays) are allowed to enter the tissues. Long exposures are then given varying from 24 to 120 hours. These ultra-penetrating rays produce very little change in the healthy cells of the part, while they have a selective action on the cancer cells, leading to their destruction. The progress of a successful case is as follows:—After a short time (three to eight days) the tumour commences to diminish in size. Cicatrization then begins and is completed in two to four weeks, or longer in obstinate cases. In the case of ulcerating tumours, a certain amount of discharge occurs during all the stages. For large and deeply-extending tumours the method of "cross-fire" is usually employed, two or more radium apparatus being applied at different points around the tumour in such a way that the ultra-penetrating rays cross in the depths of the tumour. In this way the deeper parts of a growth can be subjected to the influence of the gamma-rays far more effectively than with a single disc of radium.

The general conclusion is to the effect that most cancerous growths can be reduced in size by the application of radium. Some of the less malignant forms of growth can apparently be cured, while in the more malignant cases the temporary improvement is of short duration, and is followed by further extension of the growth.

The treatment of lupus is described—the method of using sunlight concentrated by means of a large hollow lens formed of two plates of glass 10 or 12 inches in diameter, one of which is flat and the other convex, the cavity being filled with sulphate of copper solution to absorb the heat rays. The use of the electric arc lamp as described by Finsen arose naturally from the solar method, and is now too well known to require description. In the case of both the sunlight and the electric arc it is recognised that the violet and the ultra-violet rays are those principally concerned in the curative action. The mercury-vapour lamp, being particularly rich in violet and ultra-violet rays, is very effective, particularly when a tube of quartz is used in place of glass. It is far less expensive than the Finsen arc lamp, and has taken the place of Finsen lamps for many purposes. X-ray treatment and

radium treatment have also been employed in the treatment of lupus. The author considers light treatment the most efficacious, while radium has not been employed long enough for its value to be estimated in the case of lupus.

Ringworm is now almost universally treated with the Röntgen rays. A full account of the technical details of this method is given, and the precautions necessary to prevent injury to the patient. The object of the method is to accomplish the removal of all the diseased hairs from the affected area of the scalp. It is found that a properly applied dose of X-rays results, after a fortnight, in the loosening of the hairs, which then fall out leaving a perfectly bald area which can be readily and effectively treated by antiseptic applications. When there are numerous patches of ringworm scattered over the scalp it is necessary to produce epilation of the entire scalp. For this purpose the scalp is divided into ten or twelve areas which are exposed in turn, care being taken to prevent overlapping, as this would result in the administration of an excessive dose to some parts of the scalp. Dermatitis would appear in the over-exposed portions, and permanent baldness would probably result. After a correct dose the hairs begin to grow anew after two or three months, and the new hairs are free from the disease. By the X-ray method of treatment the cure of a case of ringworm is completed in three months, whereas the older methods of treatment by local applications extended for periods of two years or even longer. In the case of the children of the poor treated in public institutions the saving of public funds that has resulted from the introduction of the X-ray treatment of ringworm has been very considerable, and the advantage to the education of the children is self-evident, for while there are any infected hairs on the head it is necessary for the children to be rigorously excluded from intercourse with other children.

Many other diseases are described in which electrical methods of treatment have been used with success. The methods are now firmly established, and the range of their utility is being defined with ever-increasing accuracy.

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DEDUCTION AND DENUATION.

Geographical Essays. By Prof. W. M. Davis. Edited by Prof. D. W. Johnson. Pp. vi+777. (London, Boston, New York, and Chicago: Ginn and Co., n.d.) Price 12s. 6d. net.

PROF. D. W. JOHNSON has done good service to science by editing this collection of the valuable memoirs by which Prof. W. M. Davis has done so much to advance physical geography and improve geographical education. The volume includes twenty-six papers hitherto scattered in twenty-one serials. The first twelve contributions are essays and lectures on geographical pedagogics; the remaining fourteen deal with various principles of physiography. It would perhaps have been more convenient if the two series had been issued separately, for the volume, though containing no plates, is heavy for its size, and while the physiographic essays may be read with great